

Task Force to Study Visual Smoke and Evacuation Alarms for the Deaf and Hard of Hearing

September 30, 2006

Staffed by:



MARYLAND
GOVERNOR'S OFFICE OF THE
DEAF AND HARD OF HEARING

September 30, 2006

Dear Governor Ehrlich, President Miller and Speaker Busch:

The Task Force to Study Visual Smoke and Evacuation Alarms for the Deaf and Hard of Hearing is pleased to present the following report and recommendations based on the Task Force's work from October 1, 2005 and September 30, 2006.

The Task Force, with the passage of Senate Bill 735 as amended, was assigned the responsibility of studying and making recommendations about emergency evacuation plans, the availability of emerging technology and its costs, the costs of installation of alarm systems specifically designed for people who are deaf and hearing, a comparison of other states' emergency evacuation plans, and an examination of all public and private funding sources available for plans and life safety equipment for people who are deaf and hard of hearing.

The Task Force has studied these issues carefully, researched different regulations and options and participated in several presentations. With the completion of this work, the Task Force has recommendations such as inclusion of individuals with hearing loss in emergency planning, seeking and providing funding to reduce the cost burden upon apartment and condominium owners, drafting of policies and/or legislation that requires evacuation plans to include individuals with disabilities, and implementing a statewide education campaign, among others.

The Task Force very much appreciates the opportunity to provide these comments on visual smoke and evacuation alarms for deaf and hard of hearing individuals. We look forward to working with the State of Maryland on the tasks that lie ahead.

Sincerely,

Yvonne M. Dunkle
Chair

BACKGROUND AND PURPOSE

Alarm systems in apartment and condominium buildings lacking visual alerts within individual units are inaccessible to residents who are deaf, deaf-blind, or hard of hearing. Inaccessible alarms jeopardize life safety.

The importance of emergency preparedness for individuals who have hearing loss cannot be emphasized enough. Federal Emergency Management Agency's (FEMA) report *Fire Risks for the Deaf or Hard of Hearing* (1999) states "deaf and hard of hearing people are at high risk from fires and fire-related injuries. Unfortunately, they are a much-overlooked community for a variety of reasons. There is a lack of quantifiable measures of fire deaths and injuries in the deaf and hard of hearing community. Neither NCHS or the U.S. Fire Administration's National Fire Incident Reporting System includes data on the presence or degree of disability of a fire victim" (p. 12).

Another group of individuals affected especially by emergency preparedness is senior citizens. "Hearing loss is one of the most common conditions affecting older adults. One in three people older than 60, and half of those older than 85, have hearing loss. As the baby boomers age, the U.S. will face the largest demographic shift in the nation's history. The topic of hearing loss and older adults simply can't be ignored" (Cienkowski, 2003). In the state of Maryland, senior citizens aged 65 or older accounted for 38 percent of fire deaths in 2005, compared to 32 percent in 2004 (Maryland State Fire Marshal, 2006). Maryland's hearing loss population should be given the same opportunity for fire safety and evacuation as all other Maryland residents, especially those who reside in apartment or condominium buildings.

The emphasis on disability groups in emergency notification and preparedness became even more significant when President George W. Bush signed Executive Order 13347 on July 22, 2004, dictating the strengthening of emergency preparedness with respect to individuals with disabilities. This policy, Bush said, addresses "cooperation among federal, state, local and tribal governments and private organizations and individuals in the implementation of emergency preparation plans as they relate to individuals with disabilities."

Senate Bill 735, introduced in 2005, required apartments and condominiums to provide visual evacuation alarms connected to the main alarm system for occupants who were deaf or hard of hearing. This would have required all landlords and associations to retrofit their alarm systems to fit guidelines. As a result, many property management entities and associations expressed concerns about the cost of these retrofits, since a two hundred-dollar cap was placed on tenant-paid expenses. Senate Bill 735 in its original form did not pass. The bill was amended to form a task force for one year to study visual smoke and evacuation alarms for people who are deaf or hard of hearing and are living in apartments or condominiums.

The Director of the Office for the Deaf and Hard of Hearing (ODHH) was appointed to chair and staff the Task Force to Study Visual Smoke and Evacuation Alarms (the Task Force) for the Deaf and Hard of Hearing, which began its work on October 1, 2005.

The Task Force was given the responsibility of studying and making recommendations in five areas:

1. Emergency evacuation plans in the state for people who are deaf and hard of hearing and who are living in apartments and condominiums;
2. The availability of emerging technology and the costs of the technology related to the security and safety of people who are deaf and hearing;
3. The costs of installation in common areas and individual areas within apartment buildings and condominiums of alarm systems specifically designed for people who are deaf and hearing;
4. A comparison of other states' emergency evacuation plans and the costs of those plans for emergency evacuation of people who are deaf and hard of hearing and are living in apartments or condominiums; and
5. An examination of all public and private funding sources available for the purpose of providing emergency evacuation plans, devices, and equipment to people who are deaf and hard of hearing and are living in apartments or condominiums.

SCOPE OF TASK FORCE REPORT

The Task Force does not intend this to be an all-inclusive report. Instead, this report aims at providing a concise explanation of the information available, through our limited expertise and resources, about fire safety for deaf and hard of hearing people. The Maryland General Assembly has commissioned this report in lieu of legislating requirements for visual smoke and evacuation alarms in apartments and condominiums. The Task Force's work was researched and put into outline form by Julie Anne Schafer of ODHH, who then presented the information to T.S. Writing Services for a final draft. The report was then submitted to Maryland's Governor and to the General Assembly on September 30, 2006.

Since the language used in Senate Bill 735 is broad, the Task Force studied issues related to three types of alerting alarms:

- Single station smoke alarms/detectors in individual dwelling units,
- Accessible alerting devices (i.e., vibrating tactile, visual, high and dual frequency, paging systems) in individual units connected to the main alarm panel, and
- Alerting devices in common areas connected to the main alarm panel.

Data on both apartments and condominiums was collected and studied; rental townhouses and single-family dwellings do not fall within the scope of this report.

LITERATURE REVIEW

Before Maryland data was studied and analyzed, the task force performed a review of existing literature. Since it is not possible to include a comprehensive review in this report, the Task Force has selected highlights from a pre-existing literature review.

In 2002, the U.S. Fire Administration funded a grant to Oklahoma State University, Fire Protection Publications and Oklahoma ABLE Tech to conduct a North American review/literature search of fire and life safety messages, programs, materials, and devices for persons with disabilities that would establish a benchmark regarding the current body of knowledge available for this at risk population. Significant findings from this 2004 literature review include:

- There is very little published information available for the general public;
- There is no organized central location for information;
- Data collection systems do not report on fires involving individuals with disabilities;
- Individuals with disabilities need to be aware of fire risks and take a proactive role in providing personal safety;
- Emergency evacuation technology exists, but no national standards have been developed;
- Few fire safety messages exist that are specific to individuals with disabilities; and
- Fire safety legislation needs to consider persons with disabilities.

KEY TERMS

Key terms are used repeatedly throughout this report. Below are definitions of these terms for the purposes of this report.

Accessible Signal

Any signal, including strobes, vibrating tactile alerts, low and dual frequency alerts, paging systems, and/or other emerging technology, that specifically alerts a deaf, deaf-blind, or hard of hearing person of the need to evacuate or take action.

Common Use/Area

Includes, but is not limited to, lobbies, hallways, stairwells, laundry rooms and recreation rooms.

Emergency Evacuation Plan

Preparation for the egress of the occupants of a facility when an emergency situation, such as fire, natural disasters, etc occurs.

Evacuation Alarm

An alarm that signals throughout the entire building when its occupants should vacate.

Initiating Device

A system component that originates transmission of a change-of-state condition, such as in a smoke-

detector, manual fire alarm box, or supervisory switch. *(As defined by the National Fire Alarm Code.)*

Notification Appliance

A fire alarm system component such as a bell, horn, speaker, light, or text display that provides audible, tactile, or visible outputs, or any combination thereof. *(As defined by the National Fire Alarm Code.)*

Visual Smoke Detector

An individual smoke detector with a strobe that is sufficient to visually warn the deaf or hard of hearing occupant(s) in an individual apartment or condominium unit. (Also, visual smoke alarm)

Visual Alarm

A notification appliance sufficient to visually warn a deaf, deaf-blind, or hard of hearing occupant that a building's alarm has been activated.

FINDINGS

Based on its research, the Task Force has several findings. Each of the five areas of study in SB 735 is explored with special attention given to information affecting Marylanders.

1. Emergency evacuation plans in the state for people who are deaf and hard of hearing and who are living in apartments and condominiums

With the exception of high-rise buildings as defined in Baltimore City, property owners, condominium, cooperative and homeowner associations, Boards of Directors and property management companies are not required by law to establish or implement emergency evacuation plans. The trend is to emphasize individual/family emergency plans, such as those found at:

- *Maryland Emergency Management Agency, (MEMA):*
<http://www.mema.state.md.us/MEMA/index.jsp>
- *The Baltimore County Office of Homeland Security and Emergency Management:* http://www.co.ba.md.us/News/emergency_prep/index.html
- *Howard County Department of County Administration-Public Information:* http://www.co.ho.md.us/DOA/DOA_PIO_Preparedness.htm

In 2004, according to a press release on the Washington Lawyers' Committee for Civil Rights and Urban Affairs Web site (www.washlaw.org), a Montgomery County (Maryland) judge ruled that the inclusion of individuals with disabilities in emergency planning is required under Title III of the Americans with Disabilities Act. However, this ruling affects only places of public accommodation. Furthermore, there continues to be no regulation requiring apartment or condominium management or landlords to establish any emergency evacuation plan, let alone a regulation that includes the notification and safe egress of individuals who are deaf, deaf-blind, or hard of hearing.

Also, in 2004, the City of Frederick created a “Neighborhood Survey” initiative to identify and assist elderly or special needs residents during an emergency event. This initiative created a voluntary registry of persons with special needs that is used in emergency situations.

Currently, there is no standardized emergency evacuation plan for this specific population in Maryland.

2. The availability of emerging technology and the costs of the technology related to the security and safety of people who are deaf and hard of hearing

Pagers

The use of pagers is widespread among many deaf, deaf-blind and hard of hearing people and is also gaining popularity among people who can hear.

In March 2006, Dan Merrell, the owner of Personal Alarm Systems (PAS), gave a presentation to the Task Force about the feasibility of using pagers as evacuation alert systems. Merrell explained that many companies or entities want to be able to notify people in a building during an emergency situation, but usually do not want the responsibility of assigning pagers and keeping running inventories of the devices. PAS addresses local paging systems, provided by private systems while leveraging pagers on a public paging network. Pagers recognizing numerical codes and multiple several numbers enable this technology. By assigning a global PAS alarm code, a network can be configured to transmit that code locally and pagers that are enabled to recognize the code will report the event. Additionally, using building-installed, low-power transmitters connected to the fire alarm system can activate the pagers. If a fire alarm sounds, a code is sent out to pagers that are inside or nearby the building, which then alerts the person carrying the pager.

Currently, PAS is working on enhanced services. One example is the use of the pagers to contact 9-1-1 and providing responders with life-saving information about the pager users. Reverse 9-1-1 capacity, where 9-1-1 networks call people in the area surrounding an event in order to notify them of the situation and any steps to take, is also being developed and will be available possibly as early as 2007.

The costs for such paging systems range between \$2,000 to \$2,500 for an entire building, and an additional \$750 to \$1,000 for additional repeaters when a new tenant moves in.

Emergency Alarms

A Combustion Science & Engineering, Inc. (CSE) study, *Awakening Effectiveness of Available Emergency Alarm Alternatives for People of Varying Hearing Ability*, found that individuals with hearing loss are at a greater risk of not awakening to emergency notification. The study, presented to the Task Force in January 2006, also found that of all devices studied, the strobe alarm was the least effective means of awakening subjects. “Of the other devices tested, study participants over the age of 60 alerted to 7% - 25% fewer alarm presentations than their 18 – 60 year old study counterparts. Expanding this

statistic to the United States population in general, people over the age of 60 effectively awoken to 26-40% fewer alarms than younger people.”

The study continued, “This data has also shown that individuals of advanced age are at a greater risk of succumbing to fires at night because of their overall difficulty awakening. This is of particular importance because individuals over 65 compose the fastest growing portion of the population (U.S. Census Bureau, 2004).”

The Intermittent Bed Shaker was recommended as an effective waking device. CSE found that this device provided complete waking reliability and was a cost-effective device equal to an audible detector for individuals who can hear.

BASIC COST ASSESSMENT OF WAKING DEVICES

Device	Cost
Standard audible alarm	\$10-\$100
Combination alarm and strobe light	\$80-\$130
Low frequency alarm (950-400 Hz)	\$40-\$180 (<i>Does not meet residential NFPA requirements.</i>)
Receiver/Continuous Bed Shaker/Sound Signaler	\$90-\$300
CSE Intermittent Bed Shaker/Standard audible alarm (SAFEAWAKE)	<i>Device is under development.</i>

Source: Wharton Business School and Northeastern University Studies

In a January 10, 2006 letter to the Task Force, a CSE representative stressed, “Visual awakening devices, namely strobes, are an ineffective means of awakening people from sleep and should not be marketed to deaf and hard of hearing people as providing fire notification equivalent to that of the standard audible detector.” CSE also wrote, “Despite differences in CSE’s and Underwriter’s Laboratory (UL) Subject 1971 report sample sizes, our sleep test results using strobes are statistically significant with a sample error of less than 20%.” CSE, unlike UL, confirmed the sleep status of each participant, and was confident in the effectiveness of the strobe device, disputing UL’s results.

The UL study included a report on research of emergency signaling devices used by deaf or hard of hearing people. Tests were performed on 101 volunteer subjects who slept at home or in a dormitory under normal conditions. UL maintained that “great care was taken to avoid any disruption of the rooms,” and that each subject’s typical sleeping environment was not disrupted, even after the signaling equipment was present.

During the testing phase, “[i]f the signal was detected, the subject (or dormitory overseer, if present) recorded the time of the detection and whether or not the subject was asleep prior to the detection” (UL Report, 1991). The alarms were activated at random times between 1 a.m. and 4 a.m., and when the alarm was detected, the signal strength was reduced for the next test. If the signal was not detected, the test took place again at the same level before returning to the original detection point. This procedure was followed until results indicated a threshold point of detection had been located. The results

demonstrated that the devices, at 110 candela, alerted about 92 percent of the subjects not using medication.

UL then administered another test, this time with 97 subjects, using non-visual signal alarms. The procedure was the same as with the visual alarms. Placing a vibrator under the pillow alerted 90 percent of the subjects, while under the mattress alerted 84 percent of the subjects.

UL's testing consisted of three phases; no data is available on the latter two phases.

3. The costs of installation in common areas and individual units within apartment buildings and condominiums of alarm systems specifically designed for people who are deaf and hard of hearing

When the Task Force began studying the costs associated with installation, it became apparent that there were three issues at hand:

1. Individual, accessible smoke detectors in each apartment or condominium unit,
2. Accessible signals located in these units that are connected to the main panel of a building's fire/evacuation alarm system providing visual notification in the event of a fire alarm, and
3. Initiating devices and notification appliances in common areas either independently operated or connected to the main panel of a building's fire/evacuation alarm systems providing an indication of an alarm in an individual unit.

Individual Visual Smoke Detectors

OVERVIEW OF REGULATIONS

Law/Policy/Regulation/Code	Requires
Annotated Code of MD, Article 38A, Section 12A, (3)(v) and Public Safety Article 9-102 (b)(6)	Landlords of rental units are required to provide single station visual smoke detectors upon a tenant's written request in individual dwelling units. Landlords may require a deposit for the smoke detector not to exceed the cost of the smoke detector.
VA: Building and Fire Code Related Laws Package, Article 36, Section 99 (5)	<p>"Smoke detectors providing an effective intensity of not less than 100 candela to warn a deaf or hearing-impaired individual shall be provided, upon request by the occupant to the landlord or proprietor, to any deaf or hearing-impaired occupant of any of the following occupancies, regardless of when constructed..."</p> <ol style="list-style-type: none"> a. All multiple-family dwellings having more than two dwelling units... b. All buildings arranged for the use of one-family or two-family dwelling units."

Public Laws of Maine, Chapter 95, Section 2.5, MRSA Section 2464 Subsection 8	“Upon the request of a deaf or hard-of-hearing occupant, the owner of the dwelling unit shall provide an approved smoke alarm suitable to warn the occupant within the dwelling unit.”
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The first step in our cost-analysis was identifying the cost of visual smoke detectors. According to a May 30, 2006 internal report to the Task Force from one of its members, costs range from \$81 to \$235 for a single unit (the costs do not include bulk order discounts).

Another cost associated with visual smoke detectors is the installation of a hard-wired system. Again, these numbers are not all-inclusive or representative of all costs; rather, they are ballpark estimates from selected companies. The Task Force collected labor estimates from three contractors, listed below.

- **Beltway Electrical Service:** \$150, plus \$30 per smoke detector.
- **B & M Electric:** \$225 per hard-wired smoke detector without strobe, from a 120-volt smoke detector in the hall to each room.
- **Hawkins Electric Service:** \$1,800 to \$2,300 without an accurate estimate, for buildings built after 1990.

Accessibility and Installation

The next step was to identify the needs for systems using visual notification appliances. In *Fire Risks for the Deaf or Hard of Hearing* (1999), FEMA states, “Apartments for deaf and hard of hearing people should be equipped with special smoke alarms for alerting residents. Smoke alarms installed in the apartments and equipped with lights or vibration devices must be linked to smoke alarms located in the common areas of the building (hallways, lobby, service rooms). The centrally located alarms will then trigger the alarms in the occupants’ apartments, even if there is no fire or smoke in the apartments” (p. 11).

According to its Web site (www.fairhousingfirst.org), the 1991 Fair Housing Act’s “design and construction requirements do not require installation of visual alarms on the interior of dwelling units; however, if there is a building system provided in the public and common use area, then the system must have the capability of supporting an audible and visual alarm system in individual units.”

Portable Smoke Detectors vs. Hard-wired Smoke Detectors

According to the July 30, 1992, *Federal Register*, “The [Department of Housing and Urban Development] recognizes that permanently installed smoke detectors for the hearing impaired may be costly. However, it is not willing to consider the use of portable equipment in fulfilling the minimum standard required under the rule. The possibilities of loss or improper use make portable detectors less reliable, especially when used as the sole warning system. The final rule has not been changed.”

This rule affects HUD subsidized housing and any housing or any federally funded or federally insured housing loans under 24 CFR Part 207 et al. and not necessarily private property management companies or condominium associations.

ADA Accessibility Guidelines

ADA Accessibility Guidelines (ADAAG) are developed and maintained by the U.S. Access Board, a federal agency. As listed on its Web site (www.access-board.gov/ada-aba/standards-update.htm) “These guidelines will drive updates of the standards used to enforce the ADA and Architectural Barriers Act (ABA). The standards, which are maintained by a handful of other Federal agencies, are what must be followed, not the Board's guidelines. The Board's guideline[sic] are not enforceable or mandatory in and of themselves, but instead serve as a baseline for updating the standards that are.” The guidelines highlighted here are the most recent as of the printing of this report, but are still awaiting approval from the Department of Justice.

ADAAG focuses on ADA's Title II, pertaining to state and local public housing or state and locally funded housing, and Title III, pertaining to places of public accommodations. Below are some of the guidelines, listed by regulation number.

215/215.1 Fire Alarm Systems

ADAAG dictates, “Where fire alarm systems provide audible alarm coverage, alarms shall comply with 215.” The only exception is, “In existing facilities, visible alarms shall not be required except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.”

215.2 Public and Common Use Areas

ADAAG states that “Alarms in public use and common use areas shall comply with 702.”

702/ Fire Alarm Systems of the ADAAG

General (702.1)

“Fire alarm systems shall have permanently installed audible and visible alarms complying with NFPA 72 (1999 or 2002 edition).”

American National Standards Institute (ANSI) A117.1

Accessible and Usable Buildings and Facilities (also known as ICC/ANSI A117.1-2003)

702.1 General. “Accessible audible and visual alarms and notification appliances shall be installed in accordance with NFPA 72 listed in Section 105.2.2, be powered by a commercial light and power source, be permanently connected to the wiring of the premises electric system, and be permanently installed.” (ANSI A 117.1 (2003))

IBC (International Building Code) (IBC 2003 Edition)

There is no statewide building code in Maryland. As a result, building codes are adopted by the county; therefore the IBC is not universally adopted. This requirement is primarily for new construction, but can impact some substantial and moderate building rehabilitation projects, depending upon the sources of funding and other considerations.

907.9.1.4 Group R-2 of the IBC

“In Group R-2 occupancies required by section 907 to have a fire alarm system, all dwelling and sleeping units shall be provided with the capability to support visible alarm notification appliances in accordance with ICC/ANSI A117.1.”

The obstacle facing the Task Force in identifying installation costs is that a general figure for costs associated with installation of an accessible fire alarm system does not exist because issues such as the age of the building and the circuitry must be addressed. Furthermore, costs developed using a hypothetical model would not be universally applicable. Costs need to be developed with actual known facts in order to be accepted.

Additionally, any and all modifications must be in compliance with the Maryland State Fire Prevention Code. Smoke alarms must display the marking of a recognized independent testing laboratory such as Underwriters Lab (UL), and be listed and approved for sale, installation and use in Maryland by the Office of the State Fire Marshal. In addition, the National Fire Protection Association (NFPA) 1, Uniform Code of 2006, states that any modifications to existing fire protection equipment can only be made in accordance with the specific listing of the equipment. Each project for modification must include a design plan for review by the authority having jurisdiction. Simply stating what kind of equipment will be installed is not considered in compliance with state fire prevention codes.

Maryland’s Fire Prevention Code states that system modifications must maintain a listing of the fire alarm system. To determine this, a complete study must be done on:

- The existing equipment,
- The proposed equipment, and
- The complete design and installation plan.

Without a thorough review of each of these components, any guess at the modification’s acceptance would be speculation. A possible solution is that the University of Maryland, Department of Fire Protection and Engineering could develop several models for different scenarios as a student project. Dr. James Milke, Associate Chair and Associate Professor of the department, offered to establish a project for students to create various models for the installation of visual evacuation alarms in apartments and condominiums. However, due to time constraints, the students could not commence such a project before the September 30, 2006 report deadline.

Accessible Signals in Common Areas Connected to the Main Panel

The Fair Housing Act, on its Web site at www.fairhousingfirst.org, requires that “alarms and other emergency warning systems that are installed in public and common use areas must be accessible. Alarms placed in these areas must have audible and visual features compliant with ANSI A117.1, Section 4.26.”

4. A comparison of other states' emergency evacuation plans and the costs of those plans for emergency evacuation of people who are deaf and hard of hearing and are living in apartments or condominiums

The Institute for Research in Construction recommends that every building should have a fire safety plan. Proulx (2000) writes, “The plan, which may be known under various names such as ‘emergency plan’ or ‘evacuation plan,’ should be posted in the building, easily seen by occupants, and used during training and drills.”

State and Federal Laws Regarding Emergency Evacuation Plans

Once again, the Task Force has been unable to identify any law in any state requiring the development of emergency evacuation plans by apartment management companies or owners. Additionally, the Task Force has been unable to determine if any state has a law requiring the development of emergency evacuation plans by condominium associations for deaf condominium owners. However, the Task Force has identified a few regulations in some states that may be beneficial to Maryland:

Florida: Effective July 1, 2006, all multi-family units 75 feet and higher are required to have an emergency evacuation plan and must comply with ADAAG. Furthermore, the law requires an extensive emergency planning education campaign and specifies that the campaign must address special needs populations. The bill also includes mandates for emergency power sources. The listed fiscal implications do not identify costs associated with the creation of evacuation plans (Adams, 2006).

Illinois: Public Act 93-0345 (2003) states, “Every high-rise building owner must establish an emergency evacuation plan for people with disabilities.”

Additionally, according to an ordinance in the City of Chicago (2002), all residential high-rise buildings (any new or existing structure over 80 feet) must have a written emergency evacuation plan for occupant emergency evacuation and drill. Regulations also state that “each Plan shall list the name and normal floor location of each regular occupant with an ambulatory restriction of any other condition or disability that could impede the ability of such occupant to swiftly exit the high-rise building in the event of an emergency. Each Plan shall designate and describe the location of one or more places of refuge or rescue for all such occupants in an emergency.” This is enforced by the Department of Buildings and the Fire Department.

New Mexico: A report prepared for the New Mexico Governor’s Commission on Disability recommends that all “apartment buildings and other residential facilities...have an evacuation plan and conduct regular drills to familiarize residents...with the escape plan” (McCampbell, 2003, p. 25).

Washington: The state of Washington requires that landlords disclose if there is an emergency evacuation plan in place, but does not require that such a plan be in place.

Additionally, Kitsap County requires that owners of multifamily units of all sizes develop emergency evacuation plans and post them in common areas. These plans are updated and submitted to the Fire Department for approval annually.

State and Federal Emergency Evacuation Plans

Some state and federal departments and agencies opt to have emergency evacuation plans that already include deaf and hard of hearing people.

California: The Governor's Office of Emergency Services addresses "Special Needs in Emergency Planning and Preparedness" with attention to communication needs on its Web site. The Web site states, "Persons who are hearing-impaired or deaf require face-to-face contact in order to read lips or understand pantomime. Writing on a note pad is only practical if there is enough available light to see. Alarm systems for fire and earthquake will benefit most people if they incorporate both audible and visual components." It also states that people with disabilities should be involved in every step of the emergency preparedness process (Imperiale, 1997).

Hawaii: In the state of Hawaii's *Interagency Action Plan for the Emergency Preparedness of People with Disabilities and Special Health Needs* (2006), the state recognizes the specific challenges faced when addressing in emergency preparedness and people who are deaf or hard of hearing. The action plan reports, "A significant challenge, as yet unresolved with no single recommendation, is how to reach the population of people who are deaf or hard-of-hearing who may not receive notification through the traditional means as the general population." An objective in the action plan is to "research and investigate alternatives for the provision of an alert paging system to warn individuals who are unable to hear the conventional siren of a possible emergency to include, but not be limited to, wireless services, and develop agreements to implement a system."

Schools and Universities Evacuation Plans

Some schools and universities provide emergency evacuation plans that include deaf and hard of hearing individuals.

Gallaudet University in Washington, D.C., uses a multi-system approach to alerting its deaf and hard of hearing faculty and students during an evacuation or emergency. The "University Notification System" is comprised of six parts:

- Fire Bell/Strobe Lights in every room
- Campus-wide e-mail
- *Gallaudet Alerts* (which sends messages to pagers)
- Flashing Blue Lights at Emergency Button Stations
- Orange Flags on Department of Public Safety bicycles
- Verbal messages

In its *Emergency Preparedness Guide for Students, Faculty, Teachers and Staff* (2002), Gallaudet outlines general emergency procedures, saying, "In some emergencies, it may

be better not to leave the place where you are and go to another location. The safest action may be to stay exactly where you are. You will be notified through the University Notification System about whether or not you should evacuate” (p. 5).

Ohio State University’s chemistry department addresses deaf and hard of hearing people’s special needs. “Disabled students and personnel (e.g., person with physical, visual, or hearing impairments, etc.) have the primary responsibility for requesting assistance... Other arrangements can include: assisting a blind or visually impaired person from the building, informing a deaf student that an alarm is sounding. Instructors must inform emergency officials of location(s) of disabled students” (p. 4).

The **University of California, Washington Center**, has an evacuation plan (2001) that says, “Individuals requiring Evacuation Assistants may be those, whose mobility is impaired, may be deaf or hard of hearing, may be visually impaired or speech impaired.”

The **University of Louisiana, Monroe** has a fire emergency plan (1997) that considers the safe egress of physically disabled people. Its Web site reports, “Deaf, but mobile persons may be unaware of the need to evacuate and should be calmly advised and guided to the nearest available exit.”

Private Employers

Even with this data, it is important to remember that the ADA does not require private employers to develop emergency preparedness plans for people with disabilities. However, the Department of Labor’s Web site reminds employers in *Effective Emergency Preparedness Planning: Addressing the Needs of Employees with Disabilities* (2005) that if an emergency preparedness plan is in place, people with disabilities must be included. Furthermore, the December 28, 2004 ruling by a Montgomery County judge requires the inclusion of individuals with disabilities in emergency planning, as outlined by Title III of the ADA.

Costs of Evacuation Plans

Another factor to consider in the development of emergency evacuation plans is the cost. Eplan (www.eplanonline.com), a consulting company specializing in emergency planning, charges for on-site visits “to conduct research, gather documents, interview department heads, hold public meetings and briefings with public officials and do installations,” which can be costly and is quoted on a plan-by-plan basis, up to \$1,000 per plan in addition to the basic price package. Eplan also charges an estimated \$30 per printed page of an evacuation plan, which includes plan development, document formatting, graphics, checklist and the database. The number of pages depends on the size and needs of each facility.

Overall, it has been determined that no fixed price or estimate can be ascertained by making comparisons to other states and their plans. Even so, there are regulations in other states that would serve well as a model for Maryland.

5. An examination of all public and private funding sources available for the purpose of providing emergency evacuation plans, devices, and equipment to people who are deaf and hard of hearing and are living in apartments or condominiums

Maryland has been able to utilize several funding sources; however, there remains a largely untapped market of resources that would benefit Maryland residents who are deaf or hard of hearing. Below are just a few examples of funded projects across the nation.

Community Emergency Preparedness Information Network (CEPIN) Project ***www.cepintdi.org***

The Community Emergency Preparedness Information Network (CEPIN) Project develops model community education programs for deaf and hard of hearing consumers in emergency preparedness. CEPIN provides coordination and oversight of accessibility resources and services in emergency preparedness, homeland security and public safety. The project's goal is to empower individuals nationwide, who are deaf or hard of hearing, to work alongside their neighbors before, during and after a crisis in order to prevent and minimize damage and promote faster recovery.

Maryland State Police ***www.mdsp.org***

The Governor's Grants Office Annual Reports for Fiscal Years 2003-2005 and 2004-2006 show that in July 2004, the Maryland State Police received federal funds to establish a program to "reduce fire deaths and fire related injuries to children under the age of 14 and citizens over the age of 65 through the installation of smoke alarms (both audible and those for the deaf and hard of hearing)...and the development of fire escape plans in residential settings" (p. 81).

The Maryland State Police began expending \$17,709 of the appropriated \$28,000 in 2004, and was given \$49,000 in 2005.

Olathe Fire Department ***www.olatheks.org/Residents/Fire***

The U.S. Department of Homeland Security awarded \$21,000 to Olathe Fire Department in Kansas City, Missouri to provide strobe carbon monoxide detectors for residents who are deaf or hard of hearing (Williams, 2005, p. B-1).

Some examples of available funding include:

Assistance to Firefighters Grant ***www.firegrantsupport.com/afg***

The Assistance to Firefighters Grant program awards grants directly to fire departments of a State to enhance their ability to protect the health and safety of the public and firefighting personnel, with respect to fire and fire-related hazards.

Access Grant (City of Citrus Heights)***www.citrusheights.net/home/index.asp?page=783***

The City of Citrus Heights in California provides up to \$5,000 in grants to improve access and safety. Grants include funding for ramps, grab-bars, visual alarms, and more, all for owner-occupied and rental homes, condominiums, half-plexes, mobile homes, and apartments; these marked with an asterisk must be legally separate from adjoining structure(s). They also include elderly residents (over the age of 62) and disabled individuals of all income levels.

Get Alarmed, Virginia!***http://165.176.249.179/grants_local_aid/get_alarmed_virginia.htm***

The Get Alarmed, Virginia! program is funded by a state-secured federal grant from the U.S. Centers for Disease Control and Prevention. The program strives to increase the number of homes with working smoke alarms and fire escape plans. Funding is available for the purchase and installation of alarms, in addition to educational and promotional materials.

CDC: National Center for Injury Prevention and Control***www.cdc.gov/od/pgo/funding/grantmain.htm***

CDC's Procurement and Grants Office has published a funding opportunity announcement, "Programs for the Prevention of Fire-Related Injuries," for an estimated \$2.3 million, subject to the availability of funds. This funding is available in 2006, with up to 16 awards. The purpose of the program is to reduce the number of residential fire-related injuries and fatalities in high-risk communities.

The Governor's Committee for Smoke Alarms for Deaf and Hard of Hearing People***www.msfa.org/smoke-alarm-hard-of-hearings.html****

Maryland's Governor's Committee for Smoke Alarms for Deaf and Hard of Hearing People receives funding from the private sector and grants to provide visual smoke detectors to deaf and hard of hearing people in Maryland

*Maryland's Governor's Office of the Deaf and Hard of Hearing (ODHH) does not administer, staff, or supervise the program listed as the 'Governor's Committee for Smoke Detectors for Deaf and Hard of Hearing People' (The Committee). The Committee was not listed in Senate Bill 735 as a member of the Task Force

CONCLUSIONS

Based on the research of the five areas of Senate Bill 735, the Task Force has drawn the following conclusions.

1. The inclusion of deaf, deaf-blind, and hard of hearing people in emergency evacuation plans for apartments and condominiums is minimal.
2. A general figure does not exist pertaining to costs associated with installing or retrofitting existing building alarm systems, mainly because of the complexities of aged systems and electrical circuitry.

3. There is disagreement in the research community pertaining to the most effective means to awaken deaf, deaf-blind, and hard of hearing individuals when an alarm is activated.
4. A lack of education and understanding of deaf, deaf-blind, and hard of hearing communication issues has led to the exclusion of deaf, deaf-blind, and hard of hearing individuals from emergency preparedness efforts.
5. Very little policy has been developed that addresses the needs pertaining to emergency evacuation of and alarms for deaf, deaf-blind, and hard of hearing individuals living in apartments and condominiums.
6. The question of who should pay for retrofits, installations and evacuation plans continues to be an issue.

RECOMMENDATIONS

In the interest of Maryland becoming a model state by leading the effort to ensure that all deaf, deaf-blind, and hard of hearing citizens receive appropriate, potentially life-saving accommodations in their homes, the Task Force to Study Visual Smoke and Evacuation Alarms for the Deaf and Hard of Hearing respectfully makes the following recommendations for the State of Maryland to the Governor and the General Assembly:

1. Seek funding from the Center for Disease Control, the Department of Housing and Community Development, and federal grants to cover the costs of retrofits and installation.
2. Include visual smoke detectors and alarms, vibrating tactile devices, low/dual frequency alarms, and other emerging technology in the discussion of universal design and/or future policy discussion.
3. Provide a cost-sharing formula that enables building tenants and owners to share the reasonable costs associated with the installation of accessible alerting equipment upon request by the tenant.
4. Establish a state fund for grants to retrofit systems for visual alarm signals.
5. Draft a policy requiring all multi-family housing to have an evacuation plan providing for the safe egress of all persons with disabilities.
6. Implement a state-wide education campaign, through the coordination of the State Fire Marshal's Office and the Office of the Deaf and Hard of Hearing, to alert all people with hearing loss to become more involved in the various methods of life safety warning to determine what systems work best for them. Such systems could include strobes, vibrating tactile devices, pagers and/or low/dual frequency alerts.

7. Encourage property management companies, building owners, condominiums, cooperatives and homeowners associations to conduct studies of feasible changes in building alarm systems to accommodate the needs of deaf, deaf-blind, and hard of hearing individuals.
8. Fund further study on emerging technology and on the effectiveness of vibrating tactile and visual alarms for sleeping deaf, deaf-blind, and hard of hearing individuals.
9. Provide an income tax incentive through a tax credit for condominium associations and apartment owners who make their buildings accessible to deaf, deaf-blind, or hard of hearing people.
10. Draft new legislation, utilizing the findings of the Task Force, that addresses the life safety concerns of deaf, deaf-blind, and hard of hearing Maryland residents living in apartments and condominiums.

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